



Wi Fi



**Product Name:** 15 Series\_ 5 in 1 Adhesive Mount Combination Antenna

**Part Number:** MT-15B-AS-B2L2W

**Features:**

- 2\*LTE, 2\*WiFi, 1\*GNSS Antenna Combination
- Support LTE 698-960MHz, 1710-2170MHz, 2300-2690MHz, 3300-3800MHz, 5150-5925MHz
- Support WiFi Dual Bands, 2400-2500MHz, 5150-5850MHz
- GPS / GLONASS / BEIDOU / GALILEO / QZSS / SBAS L1 Bands
- Adhesive Mounting, Direct Stick on Target Plate
- Customizable Cables and Connectors
- RoHS & REACH Compliant

**Applications:**

- Vehicle Communication
- IoT Application
- Vending Machine Application

# 5 in 1 Adhesive Mount Combination Antenna

**MODEL: MT-15B-AS-B2L2W**

Rev. Preliminary

## I. Specifications:

Items	Specifications		
<b>GNSS Electrical Characteristics</b>			
<b>Application Bands</b>	BeiDou	GPS	GLONASS
<b>Frequencies (MHz)</b>	1561	1575.42	1602
<b>Efficiency (%)</b>	49.89	42.76	58.61
<b>Average Gain (dBi)</b>	-3.02	-3.69	-2.32
<b>Peak Gain (dBi)</b>	1.21	1.21	1.44
<b>Active Antenna Performance</b>			
<b>Application band</b>	BeiDou	GPS	GLONASS
<b>Frequencies (MHz)</b>	1561 ± 2.046MHz	1575.42 ± 1.023MHz	1602 ± 5MHz
<b>Gain (dB)</b>	27	27	27
<b>Noise Figure (dB)</b>	0.98	0.98	0.92
<b>Input voltage:</b>	3~5V		
<b>Current Consumption</b>	9.0mA (typical)		
<b>Output Impedance (Ω)</b>	50		
<b>GNSS _Out Of Band Rejection</b>			
<b>Frequencies (MHz)</b>	600~1300	1300~1530	1650~3000
<b>Out Of Band Rejection (dB)</b>	55	30	30
<b>ESD Protection</b>			
<b>Contact (KV)</b>	± 8		
<b>Air (KV)</b>	± 15		

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Passive Antenna Performance									
<b>V.S.W.R</b>		< 2							
<b>Return loss (dB)</b>		< -10							
<b>Impedance (<math>\Omega</math>)</b>		50							
<b>Polarization</b>		R.H.C.P. (Right Handed Circular Polarization)							
<b>Cable / Length</b>		H-100 / 1 meter							
<b>Connector</b>		SMA (Male)							
Items		LTE MIMO1							
<b>Application Bands</b>	LTE 700	GSM 850/900	DCS	PCS	UMTS1	LTE2600	5G NR Band	5G NR Band	
<b>Frequencies (MHz)</b>	698 ~ 824	824 ~ 960	1710 ~ 1880	1850 ~ 1990	1920 ~ 2170	2300 ~ 2690	3300 ~ 3800	5150 ~ 5925	
Efficiency (%)									
<b>Free Space</b>	<b>30cm</b>	45.72	55.91	66.24	76.72	73.49	71.50	67.05	56.61
	<b>1M</b>	44.47	54.23	63.55	73.55	70.23	67.66	62.52	50.34
	<b>2M</b>	40.56	48.99	55.35	63.89	60.35	56.27	49.50	34.03
	<b>3M</b>	36.99	44.25	48.21	55.51	51.86	46.81	39.19	23.01
	<b>5M</b>	30.77	36.11	36.57	41.89	38.30	32.38	24.56	10.52
Average Gain (dBi)									
<b>Free Space</b>	<b>30cm</b>	-3.40	-2.53	-1.79	-1.15	-1.34	-1.46	-1.74	-2.47
	<b>1M</b>	-3.52	-2.66	-1.97	-1.33	-1.54	-1.70	-2.04	-2.98
	<b>2M</b>	-3.92	-3.10	-2.57	-1.95	-2.19	-2.50	-3.05	-4.68
	<b>3M</b>	-4.32	-3.54	-3.17	-2.56	-2.85	-3.30	-4.07	-6.38
	<b>5M</b>	-5.12	-4.42	-4.37	-3.78	-4.17	-4.90	-6.10	-9.78
Peak Gain (dBi)									
<b>Free Space</b>	<b>30cm</b>	2.52	2.89	3.75	4.71	4.71	3.50	5.05	4.13
	<b>1M</b>	2.40	2.74	3.57	4.53	4.53	3.26	4.78	3.62
	<b>2M</b>	2.00	2.24	2.97	3.93	3.93	2.46	3.88	1.92
	<b>3M</b>	1.60	1.74	2.37	3.33	3.33	1.66	2.98	0.22
	<b>5M</b>	0.80	0.74	1.17	2.13	2.13	0.06	1.18	-3.18

<b>V.S.W.R</b>		< 3							
<b>Return Loss (dB)</b>		< -6							
<b>Impedance (<math>\Omega</math>)</b>		50							
<b>Polarization</b>		Linear							
<b>Cable / Length</b>		SNC-200 / 1 meter							
<b>Connector</b>		SMA (Male)							
Items		LTE MIMO2							
<b>Application Bands</b>	LTE 700	GSM 850/900	DCS	PCS	UMTS1	LTE2600	5G NR Band	5G NR Band	
<b>Frequencies (MHz)</b>	698 ~ 824	824 ~ 960	1710 ~ 1880	1850 ~ 1990	1920 ~ 2170	2300 ~ 2690	3300 ~ 3800	5150 ~ 5925	
<b>Efficiency (%)</b>									
<b>Free Space</b>	<b>30cm</b>	41.35	53.11	66.94	75.16	73.72	58.93	60.06	62.70
	<b>1M</b>	40.22	51.51	64.22	72.06	70.44	55.76	55.99	55.76
	<b>2M</b>	36.68	46.53	55.93	62.60	60.53	46.38	44.33	37.70
	<b>3M</b>	33.45	42.03	48.72	54.38	52.02	38.58	35.10	25.49
	<b>5M</b>	27.83	34.30	36.95	41.04	38.41	26.69	22.00	11.65
<b>Average Gain (dBi)</b>									
<b>Free Space</b>	<b>30cm</b>	-3.84	-2.75	-1.74	-1.24	-1.32	-2.30	-2.21	-2.03
	<b>1M</b>	-3.96	-2.88	-1.92	-1.42	-1.52	-2.54	-2.52	-2.54
	<b>2M</b>	-4.36	-3.32	-2.52	-2.03	-2.18	-3.34	-3.53	-4.24
	<b>3M</b>	-4.76	-3.76	-3.12	-2.65	-2.84	-4.14	-4.55	-5.94
	<b>5M</b>	-5.56	-4.65	-4.32	-3.87	-4.16	-5.74	-6.58	-9.34
<b>Peak Gain (dBi)</b>									
<b>Free Space</b>	<b>30cm</b>	2.45	6.96	3.69	4.61	4.61	4.75	4.18	4.66
	<b>1M</b>	2.33	6.81	3.51	4.40	4.40	4.51	3.91	4.15
	<b>2M</b>	1.93	6.31	2.91	3.70	3.70	3.71	3.01	2.45
	<b>3M</b>	1.53	5.81	2.31	3.09	3.09	2.91	2.11	0.75
	<b>5M</b>	0.73	4.81	1.11	1.89	1.89	1.31	0.31	-2.65
<b>V.S.W.R</b>		< 3							
<b>Return Loss (dB)</b>		< -6							
<b>Impedance (<math>\Omega</math>)</b>		50							

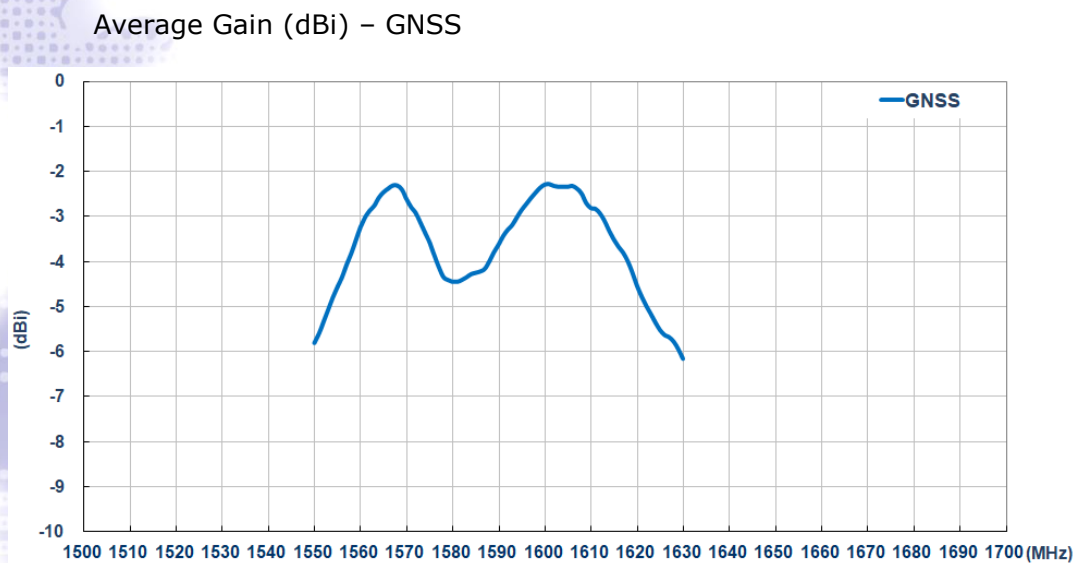
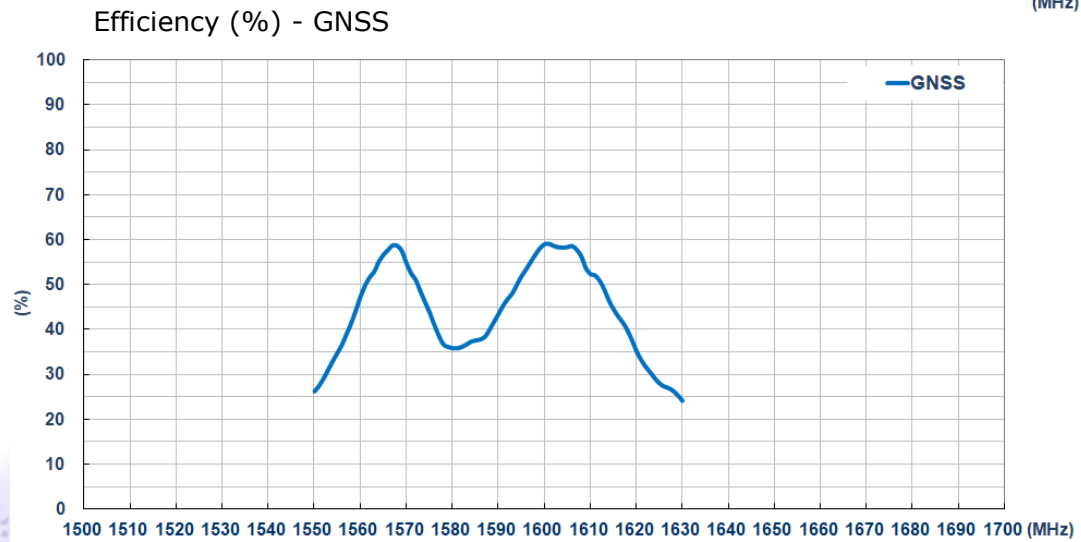
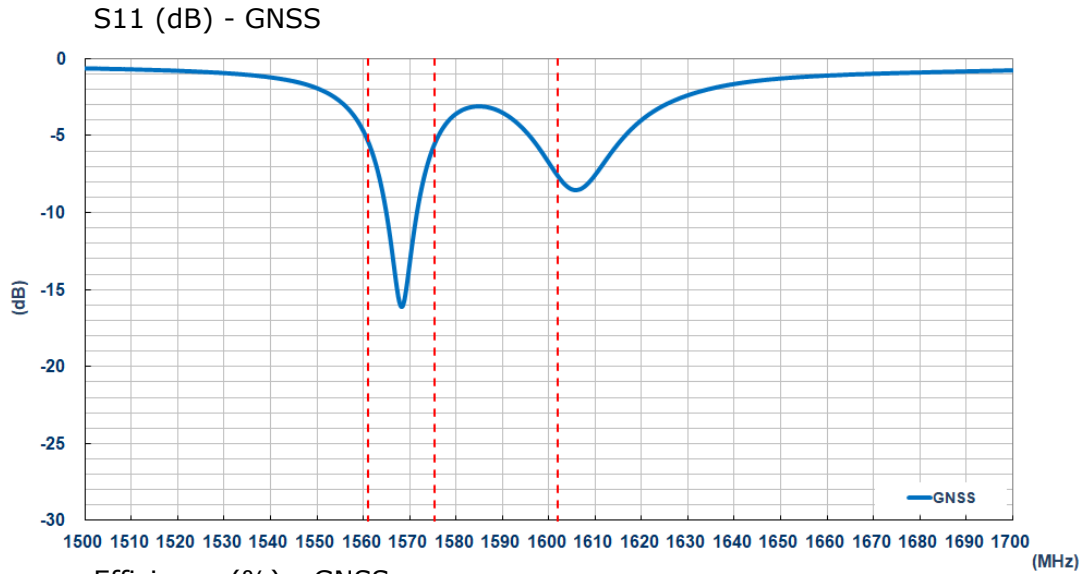
<b>Polarization</b>	Linear							
<b>Cable / Length</b>	SNC-200 / 1 meter							
<b>Connector</b>	SMA (Male)							
<b>Items</b>	<b>WiFi MIMO1</b>							
<b>Frequencies (MHz)</b>	2400	2450	2500	5150	5350	5750	5850	
<b>Efficiency (%)</b>								
<b>Free Space</b>	<b>30cm</b>	64.65	54.90	44.94	77.97	87.28	97.48	75.32
	<b>1M</b>	54.08	45.92	37.58	53.33	59.70	66.68	51.52
	<b>2M</b>	44.98	38.19	31.26	36.06	40.36	45.08	34.83
	<b>3M</b>	37.41	31.77	26.00	24.38	27.29	30.48	23.55
	<b>5M</b>	25.88	21.98	17.99	11.14	12.47	13.93	10.76
<b>Average Gain (dBi)</b>								
<b>Free Space</b>	<b>30cm</b>	-1.89	-2.60	-3.47	-1.08	-0.59	-0.11	-1.23
	<b>1M</b>	-2.67	-3.38	-4.25	-2.73	-2.24	-1.76	-2.88
	<b>2M</b>	-3.47	-4.18	-5.05	-4.43	-3.94	-3.46	-4.58
	<b>3M</b>	-4.27	-4.98	-5.85	-6.13	-5.64	-5.16	-6.28
	<b>5M</b>	-5.87	-6.58	-7.45	-9.53	-9.04	-8.56	-9.68
<b>Peak Gain (dBi)</b>								
<b>Free Space</b>	<b>30cm</b>	2.80	3.85	3.76	6.59	6.96	5.58	4.75
	<b>1M</b>	2.02	3.07	2.98	4.94	5.31	3.93	3.10
	<b>2M</b>	1.22	2.27	2.18	3.24	3.61	2.23	1.40
	<b>3M</b>	0.42	1.47	1.38	1.54	1.91	0.53	-0.30
	<b>5M</b>	-1.18	-0.13	-0.22	-1.86	-1.49	-2.87	-3.70
<b>V.S.W.R</b>	< 3							
<b>Return Loss (dB)</b>	< -6							
<b>Impedance (<math>\Omega</math>)</b>	50							
<b>Polarization</b>	Linear							
<b>Cable / Length</b>	SNC-200 / 1 meter							
<b>Connector</b>	SMA (Male)							

Items		WiFi MIMO2						
<b>Frequencies (MHz)</b>		2400	2450	2500	5150	5350	5750	5850
<b>Efficiency (%)</b>								
<b>Free Space</b>	<b>30cm</b>	72.54	61.46	60.48	76.72	93.09	93.73	71.76
	<b>1M</b>	60.67	51.40	50.58	52.48	63.68	64.12	49.09
	<b>2M</b>	50.47	42.76	42.07	35.48	43.05	43.35	33.19
	<b>3M</b>	41.98	35.56	34.99	23.99	29.11	29.31	22.44
	<b>5M</b>	29.04	24.60	24.21	10.96	13.30	13.40	10.26
<b>Average Gain (dBi)</b>								
<b>Free Space</b>	<b>30cm</b>	-1.39	-2.11	-2.18	-1.15	-0.31	-0.28	-1.44
	<b>1M</b>	-2.17	-2.89	-2.96	-2.80	-1.96	-1.93	-3.09
	<b>2M</b>	-2.97	-3.69	-3.76	-4.50	-3.66	-3.63	-4.79
	<b>3M</b>	-3.77	-4.49	-4.56	-6.20	-5.36	-5.33	-6.49
	<b>5M</b>	-5.37	-6.09	-6.16	-9.60	-8.76	-8.73	-9.89
<b>Peak Gain (dBi)</b>								
<b>Free Space</b>	<b>30cm</b>	3.24	2.71	2.92	6.77	8.18	8.30	6.83
	<b>1M</b>	2.46	1.93	2.14	5.12	6.53	6.65	5.18
	<b>2M</b>	1.66	1.13	1.34	3.42	4.83	4.95	3.48
	<b>3M</b>	0.86	0.33	0.54	1.72	3.13	3.25	1.78
	<b>5M</b>	-0.74	-1.27	-1.06	-1.68	-0.27	-0.15	-1.62
<b>V.S.W.R</b>		< 3						
<b>Return Loss (dB)</b>		< -6						
<b>Impedance (<math>\Omega</math>)</b>		50						
<b>Polarization</b>		Linear						
<b>Cable / Length</b>		SNC-200 / 1 meter						
<b>Connector</b>		SMA (Male)						

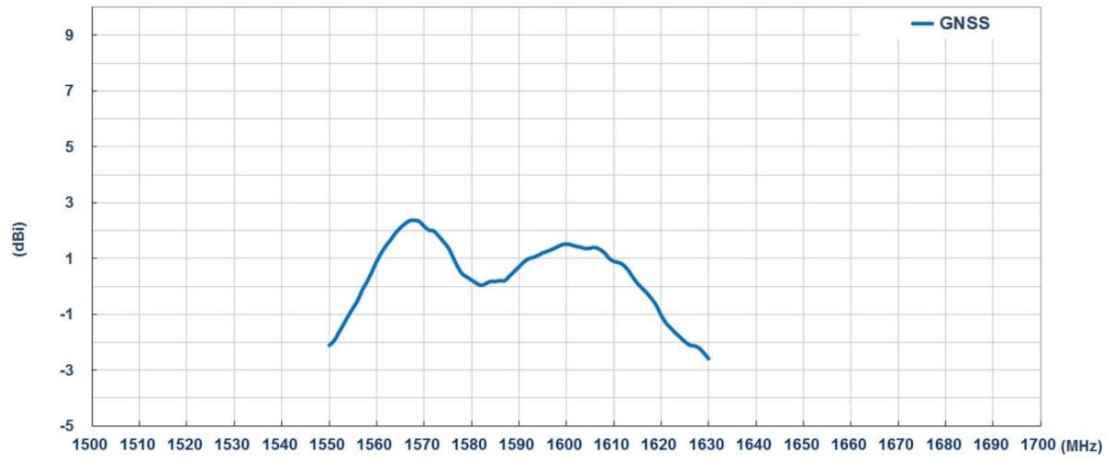
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## II. Antenna Technical Parameters:

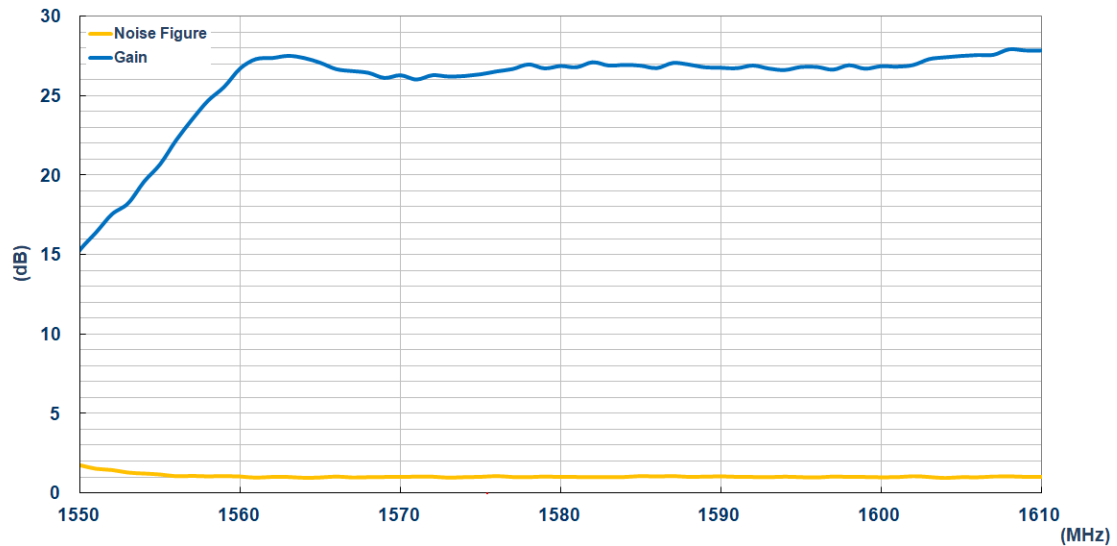
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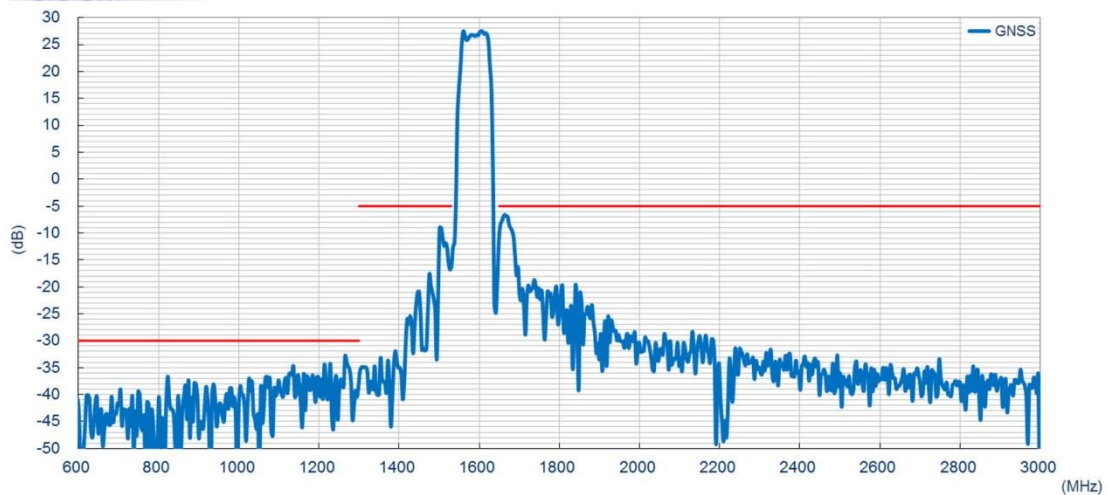
Peak Gain (dBi) – GNSS



Noise Figure & Gain (dB) - GNSS

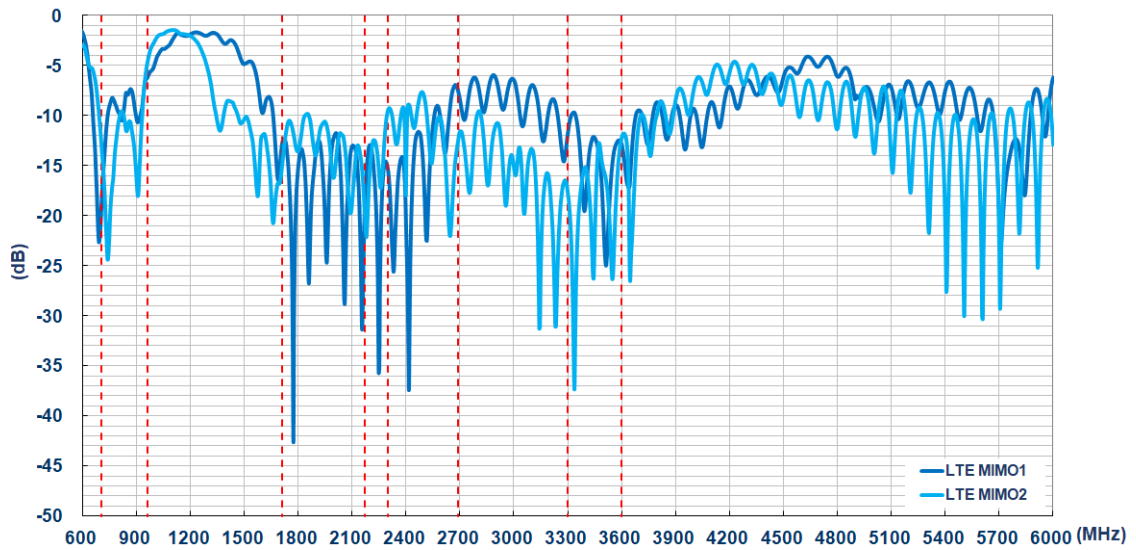


Out Of Band Rejection (dB) - GNSS

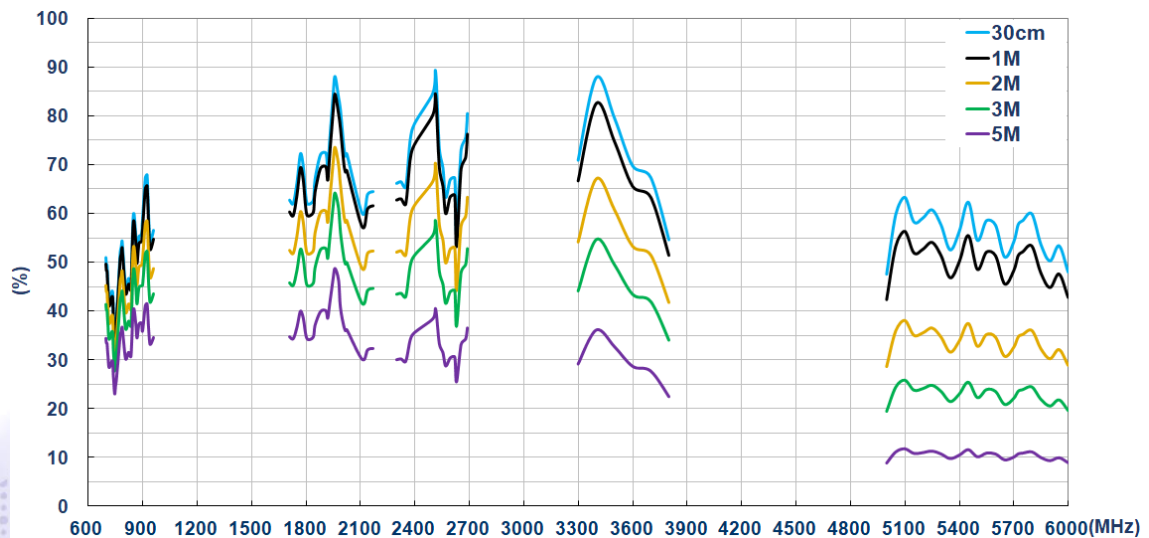




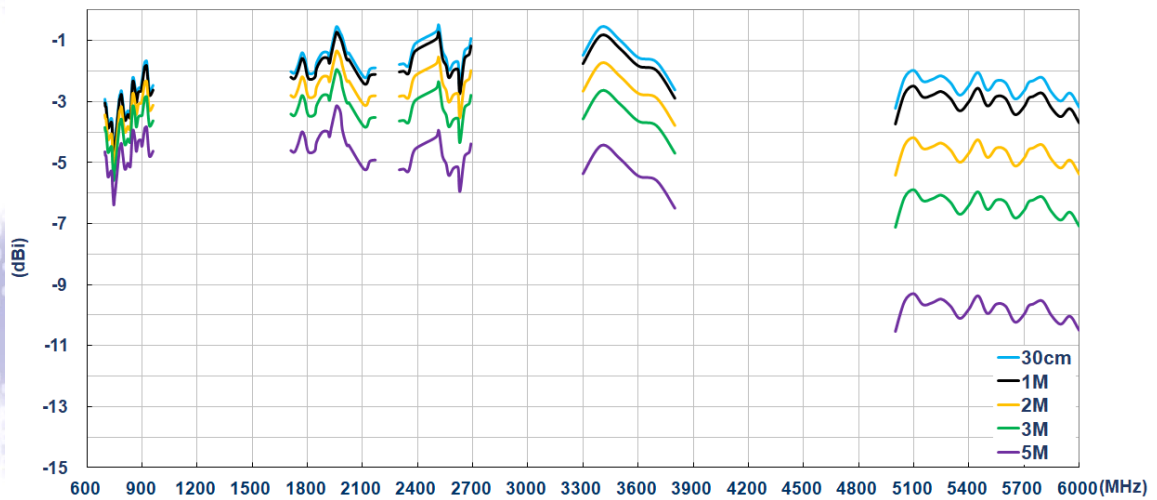
S11 (dB) – LTE MIMO1 & MIMO2



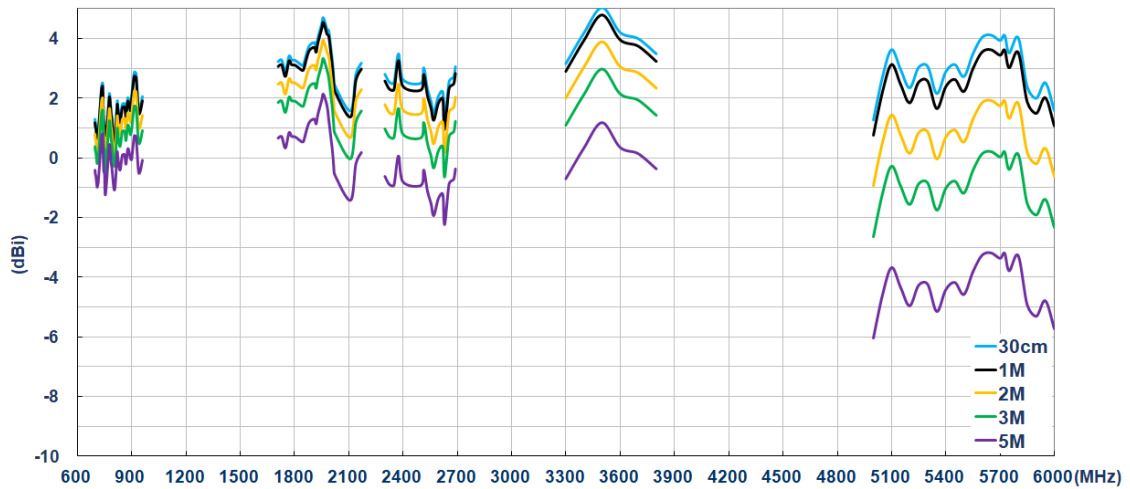
Efficiency (%) – LTE MIMO1



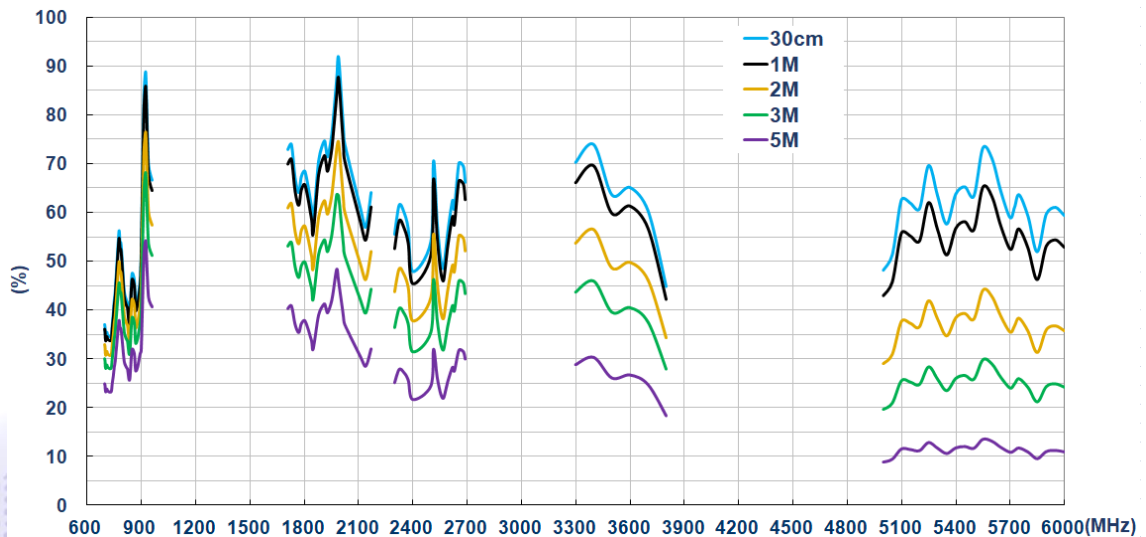
Average Gain (dBi) - LTE MIMO1



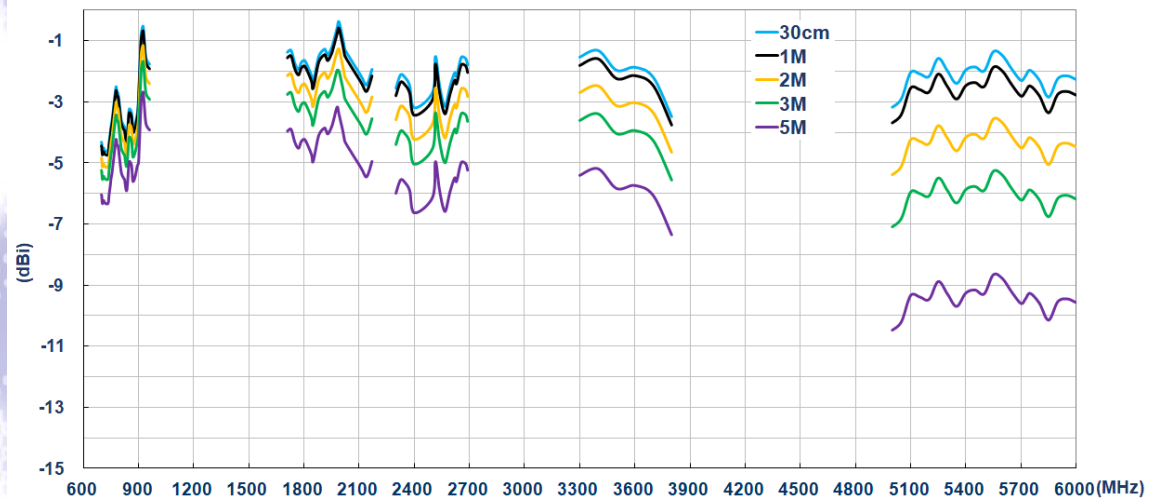
Peak Gain (dBi) -LTE MIMO1



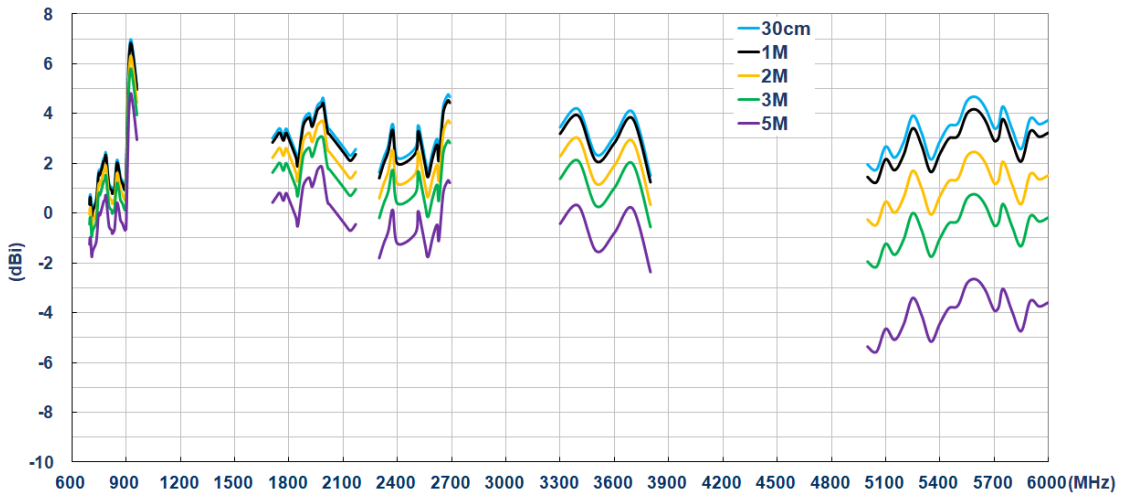
Efficiency (%) -LTE MIMO2



Average Gain (dBi) - LTE MIMO2

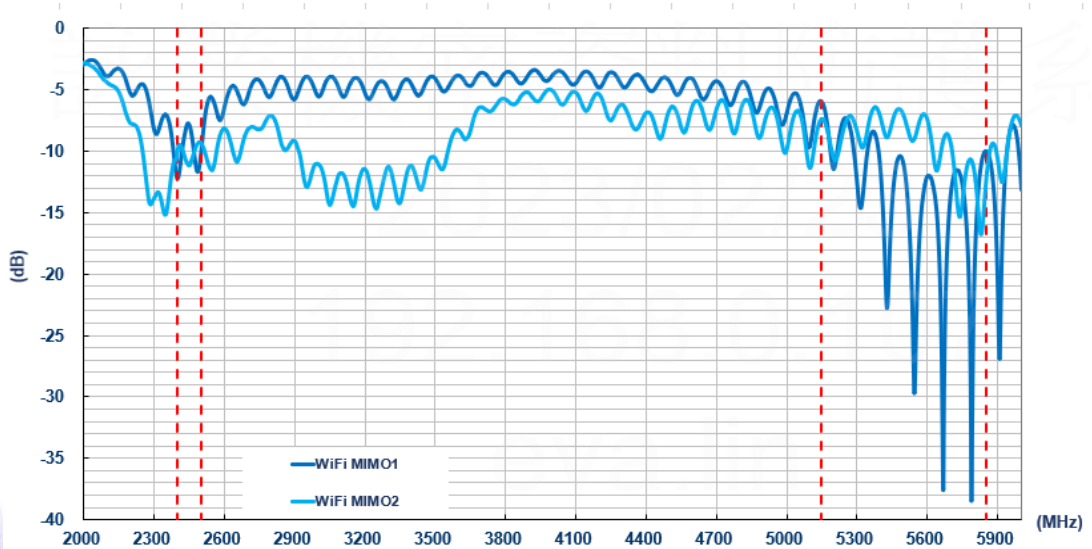


Peak Gain (dBi) –LTE MIMO2

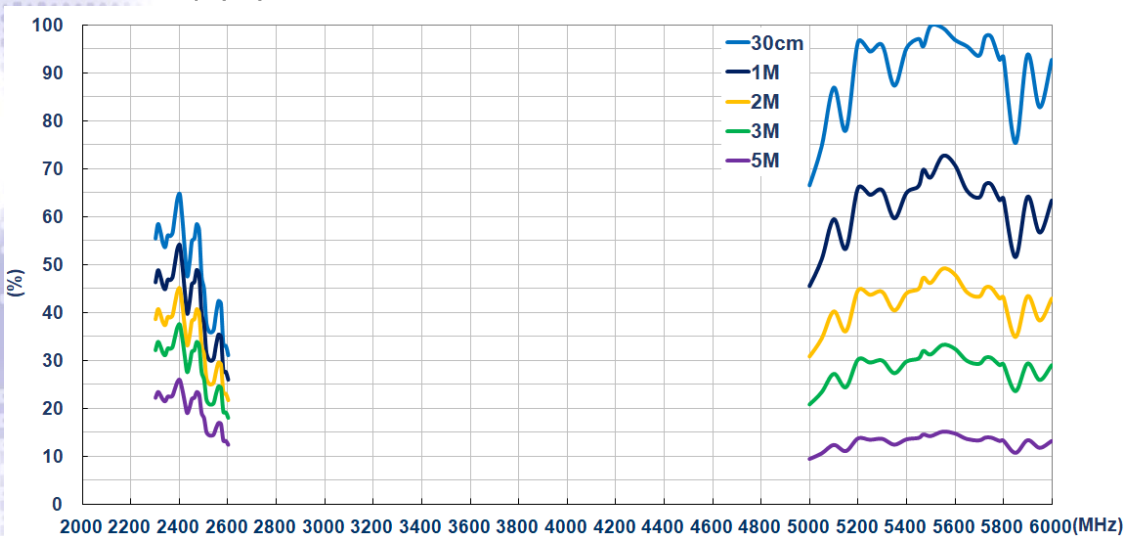


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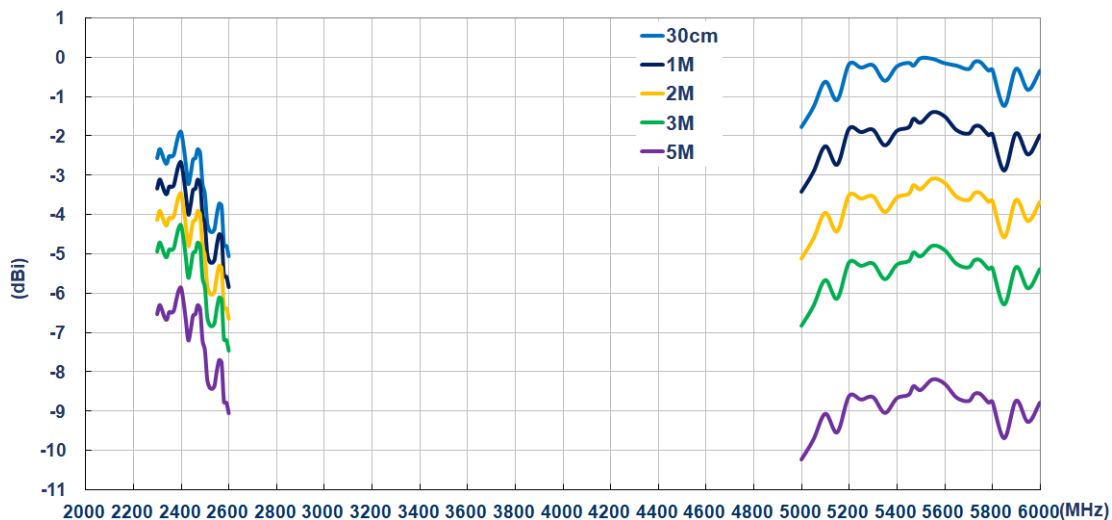
S11 (dB) – WiFi MIMO1 & MIMO2



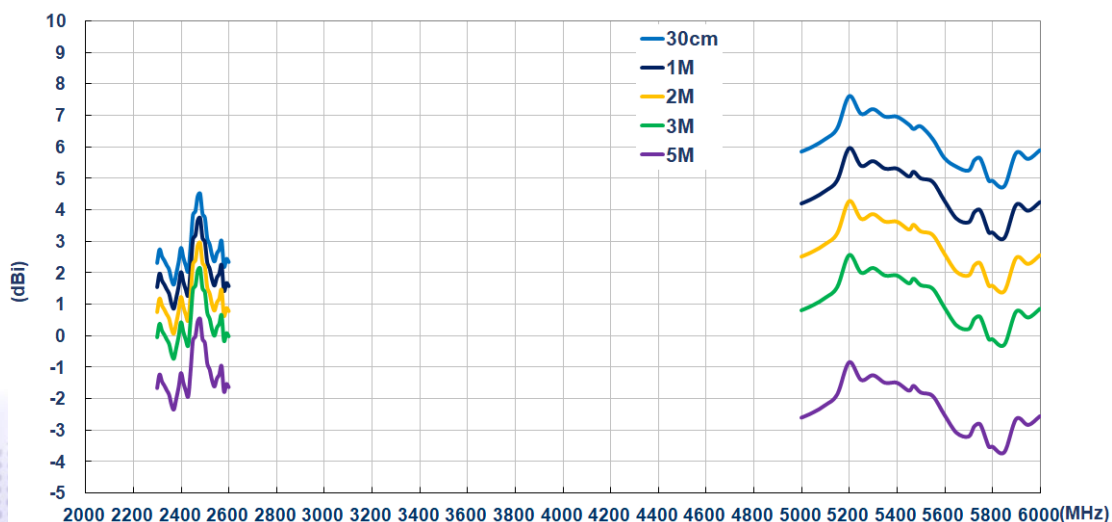
Efficiency (%) – WiFi MIMO1



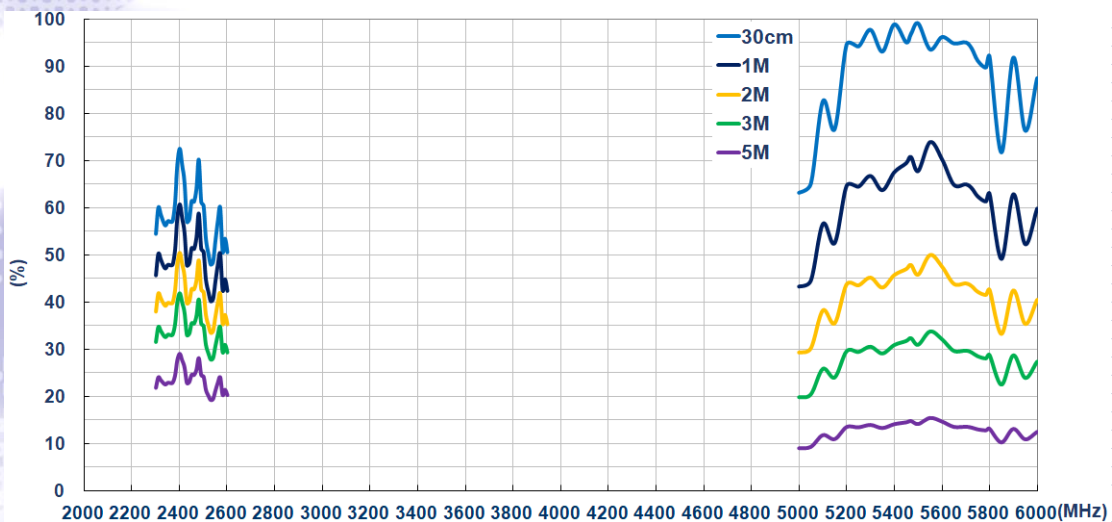
Average Gain (dBi) - WiFi MIMO1



Peak Gain (dBi) - WiFi MIMO1

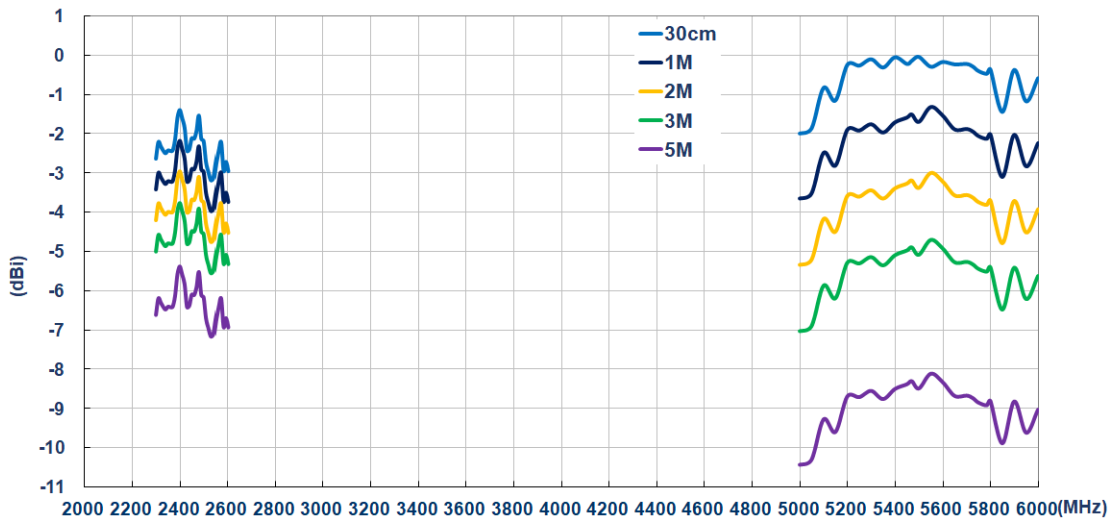


Efficiency (%) - WiFi MIMO2



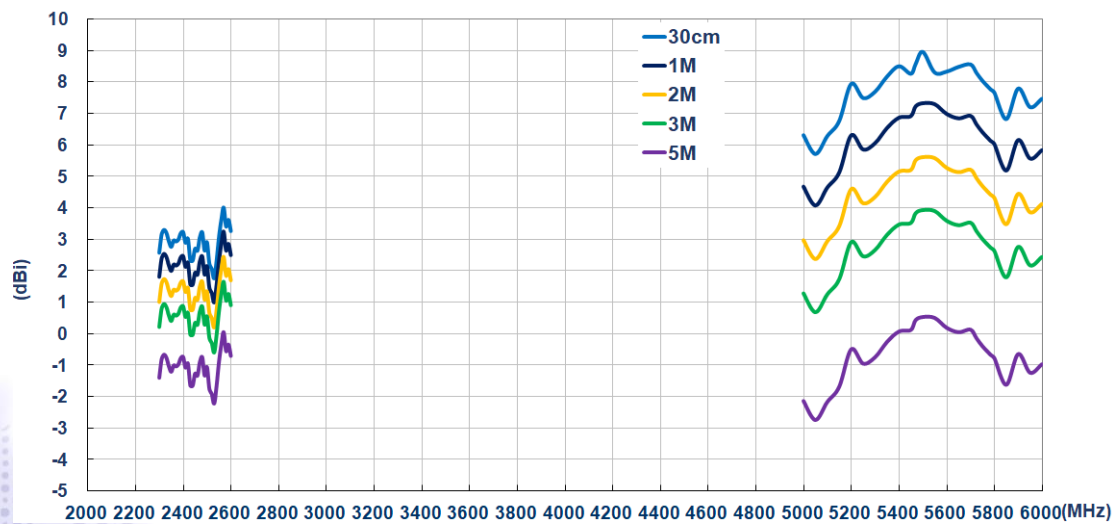
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Average Gain (dBi) - WiFi MIMO2



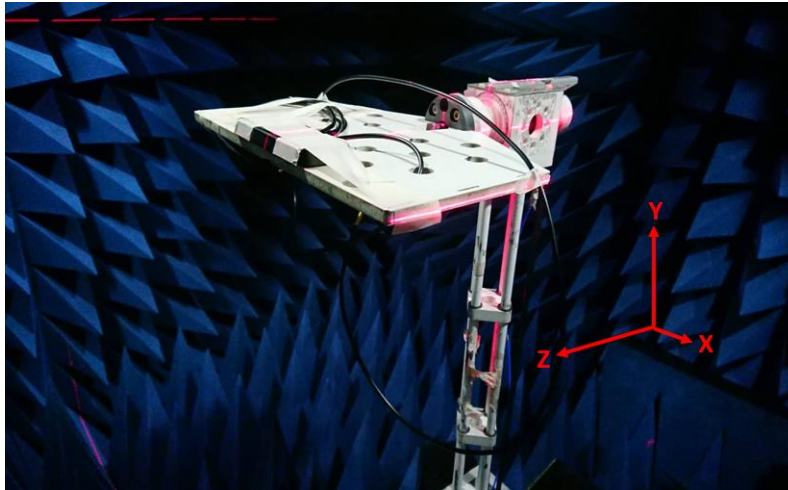
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Peak Gain (dBi) -WiFi MIMO2



### III. Antenna Radiation Pattern Measurement:

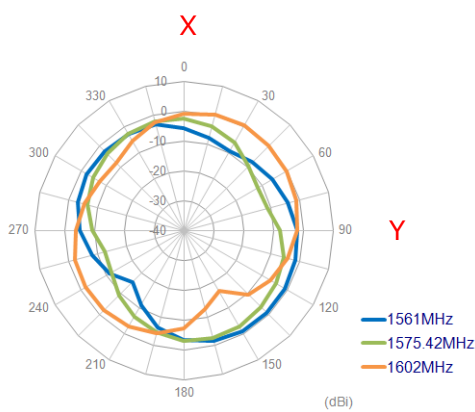
The antenna radiation patterns were measured in Anechoic Chamber. The measurement setup as below,



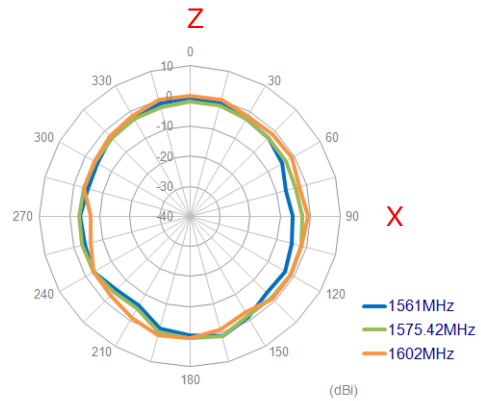
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### IV. 2D Radiation Pattern:

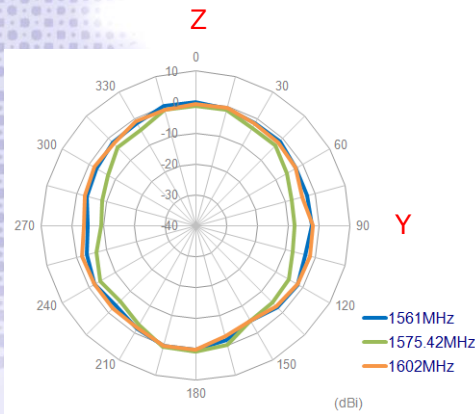
GNSS X-Y Plane



GNSS X-Z Plane

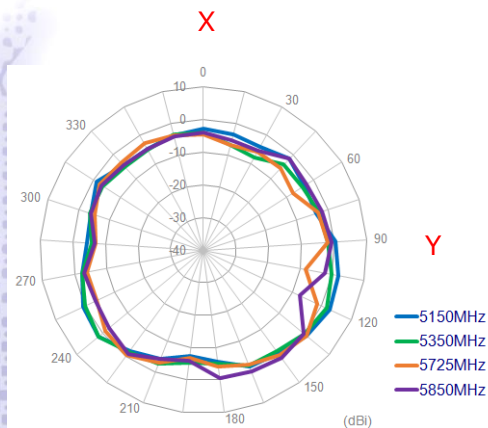
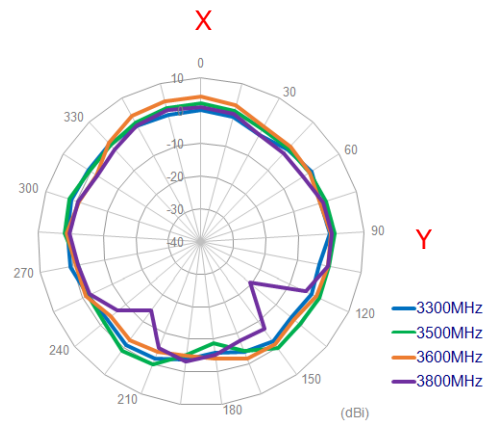
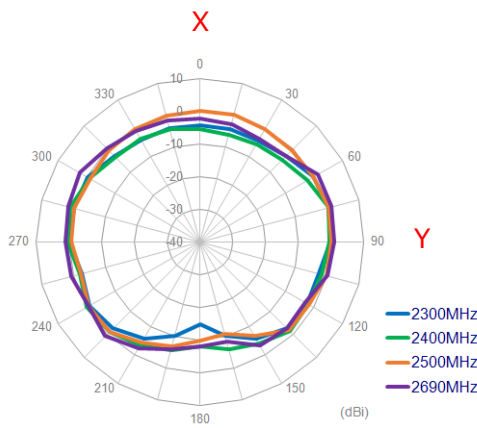
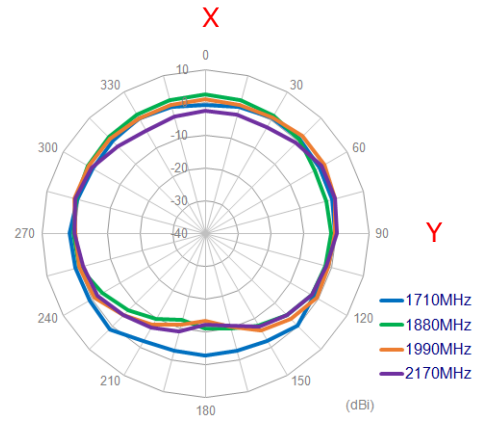
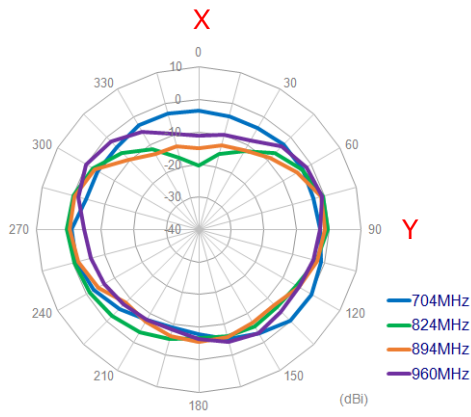


GNSS Y-Z Plane



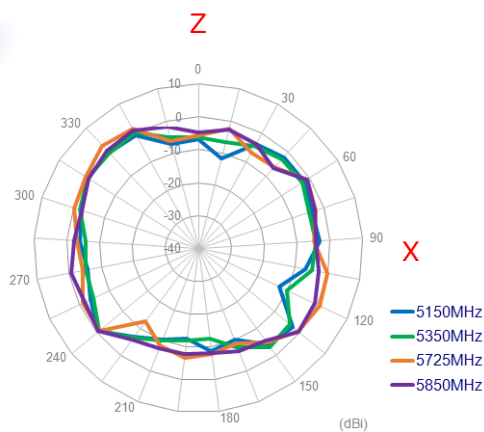
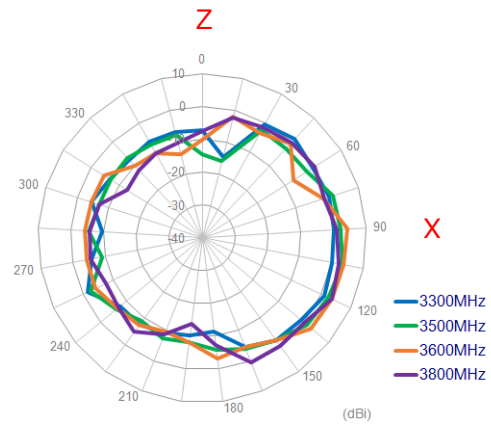
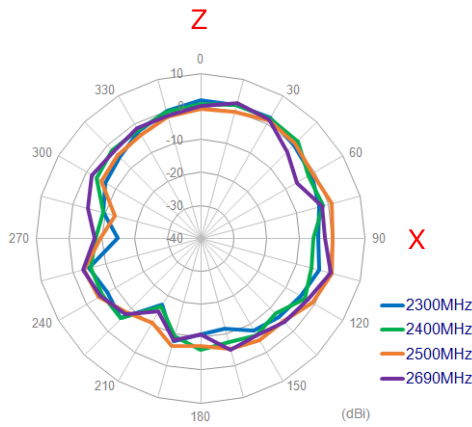
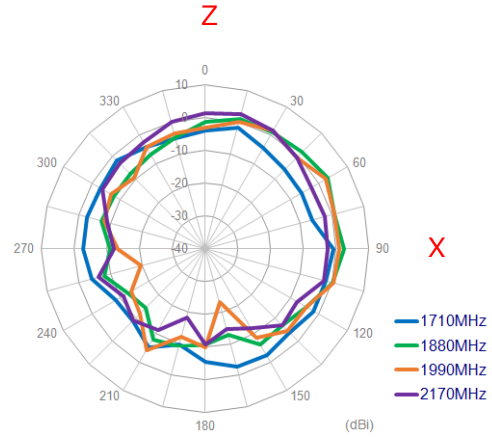
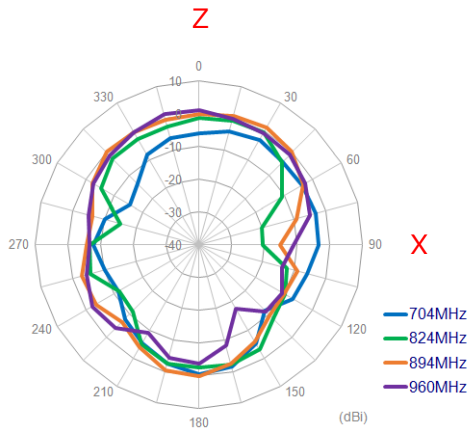
# LTE MIMO1

## X-Y Plane



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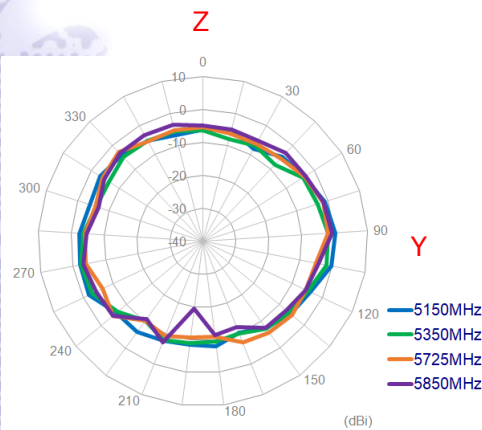
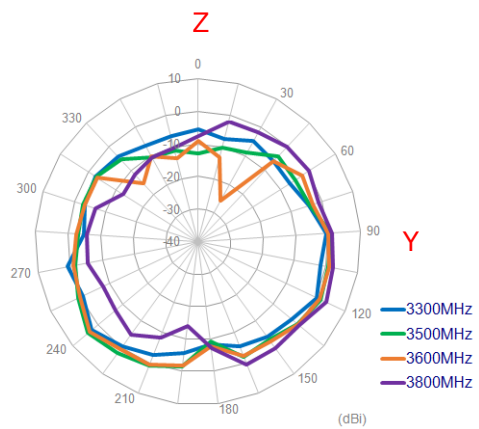
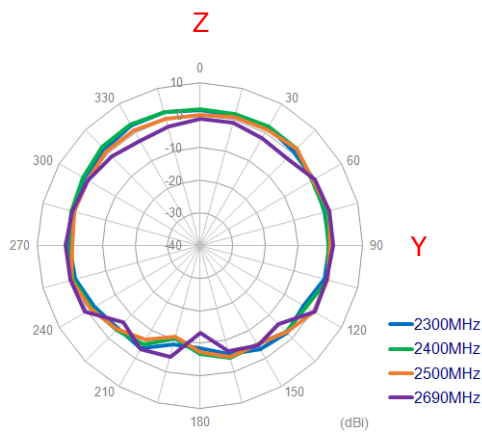
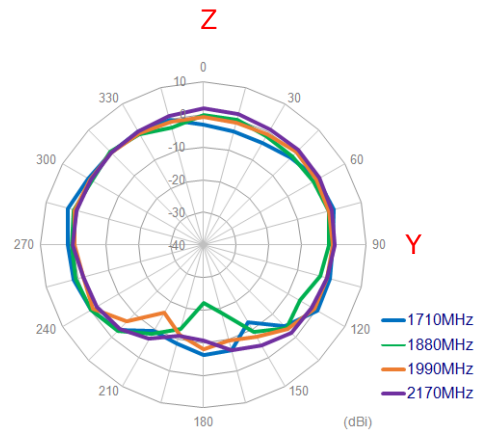
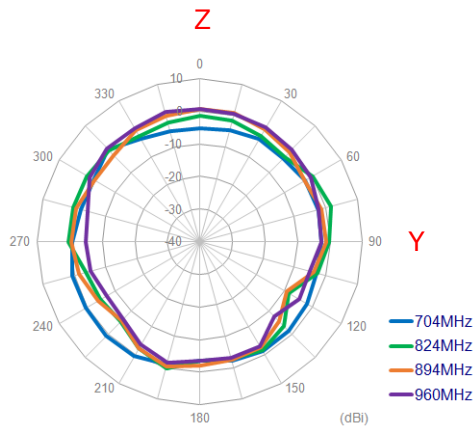
X-Z Plane



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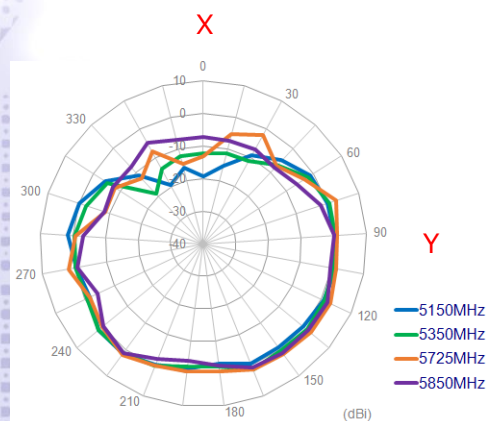
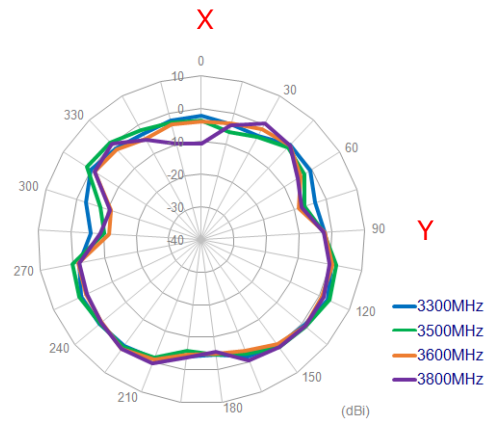
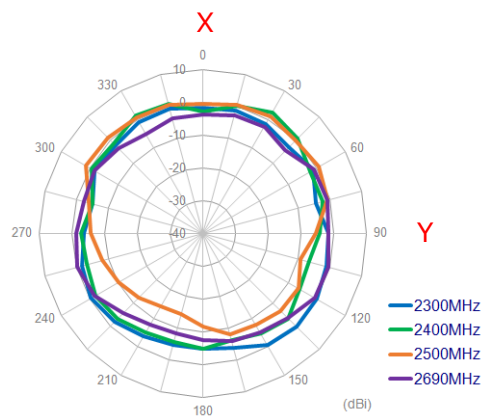
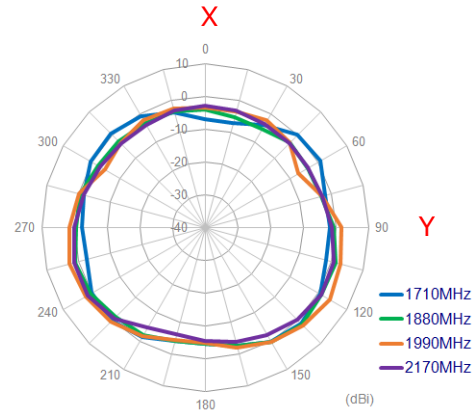
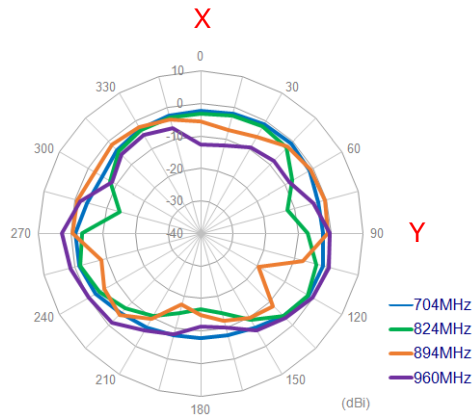
Y-Z Plane



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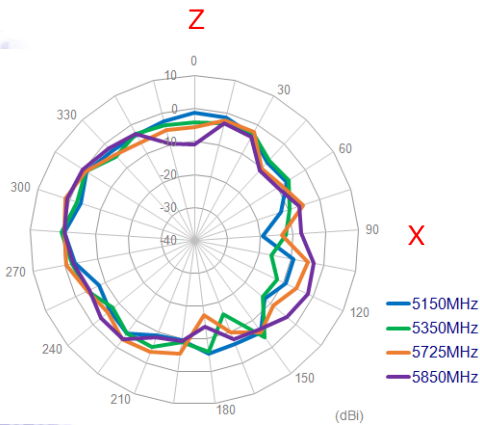
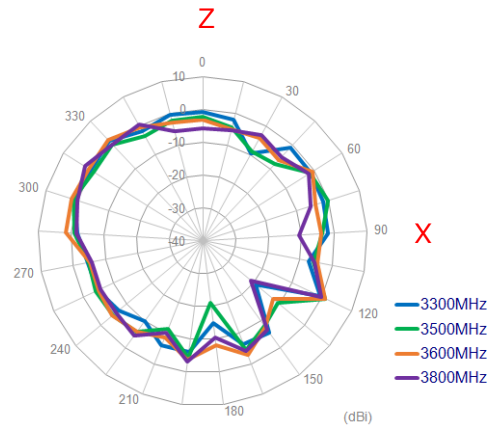
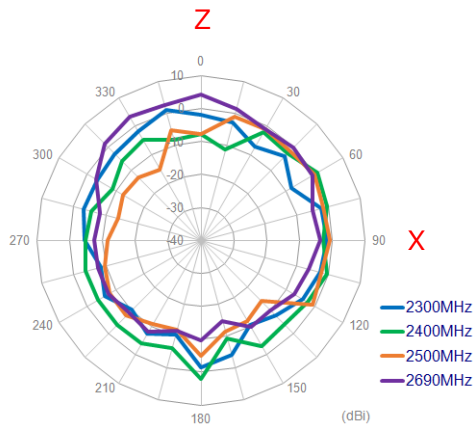
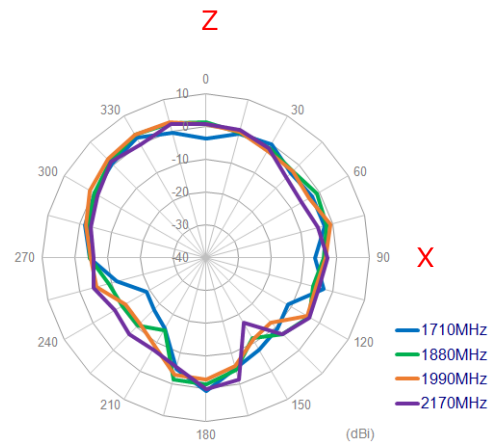
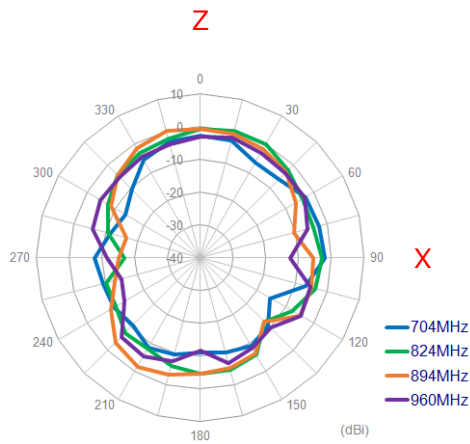
## LTE MIMO2

### X-Y Plane



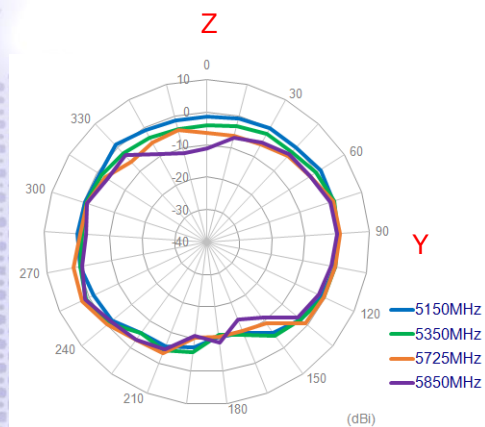
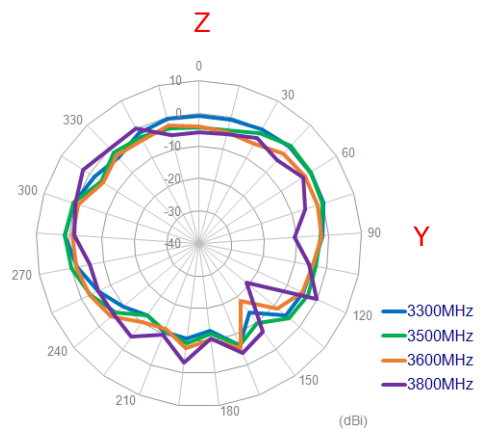
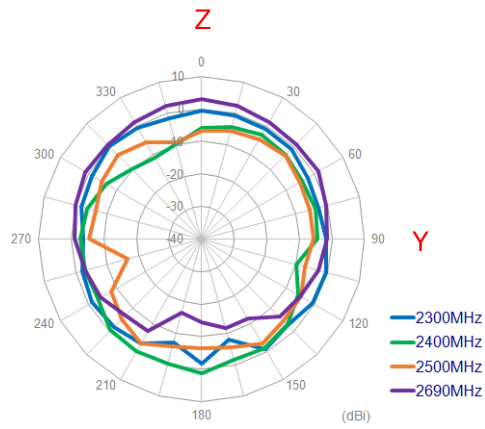
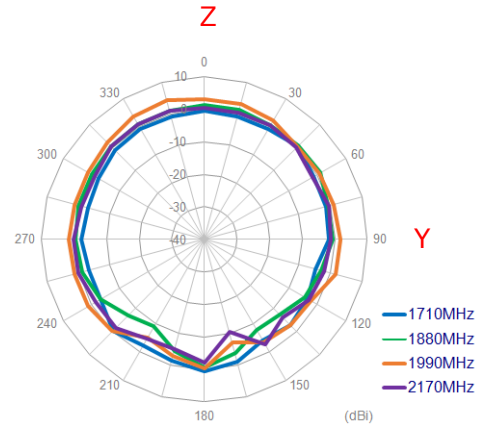
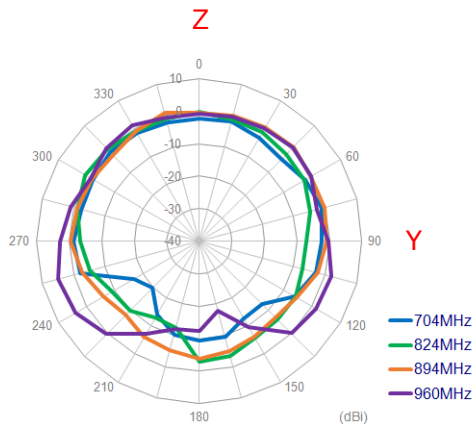
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X-Z Plane



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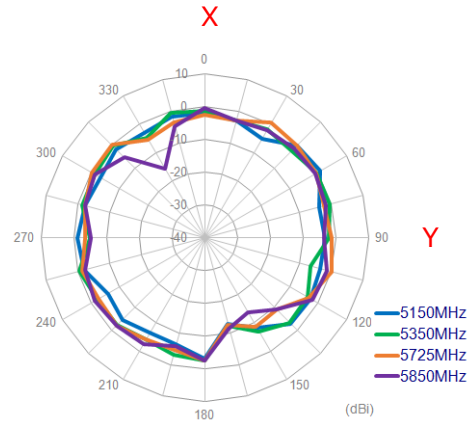
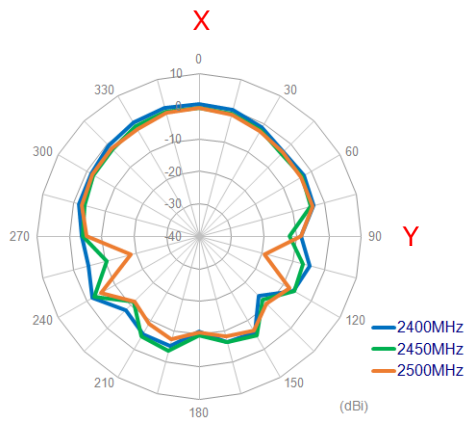
Y-Z Plane



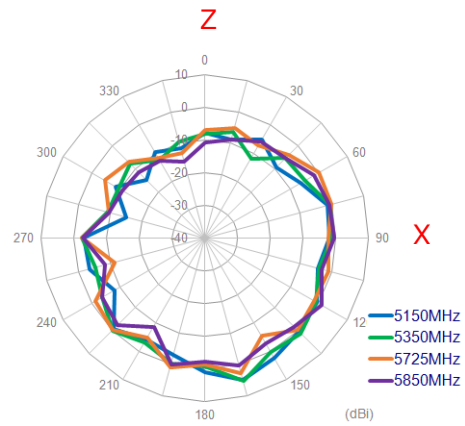
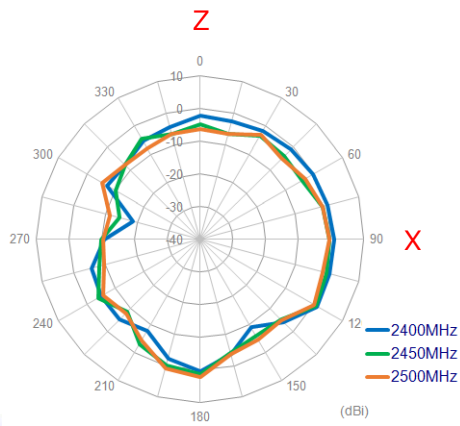
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## WiFi MIMO1

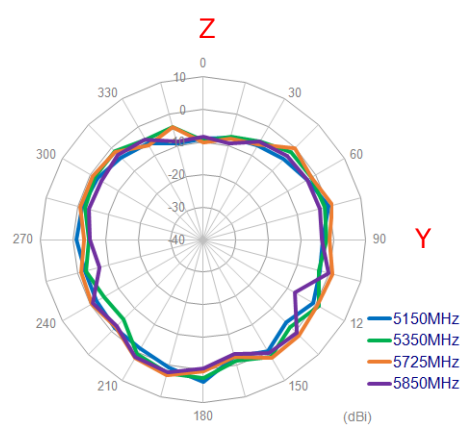
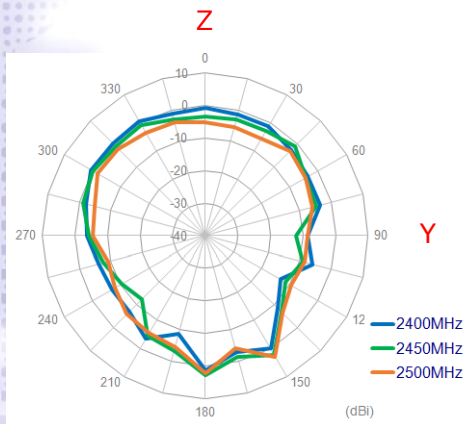
### X-Y Plane



### X-Z Plane

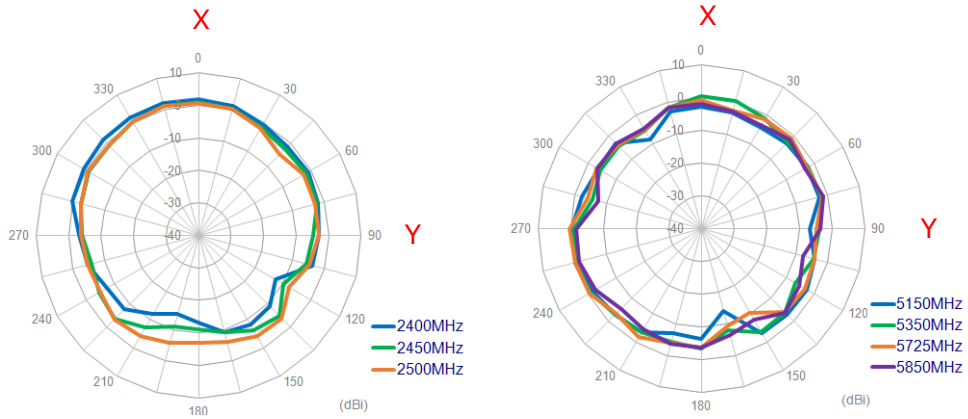


### Y-Z Plane

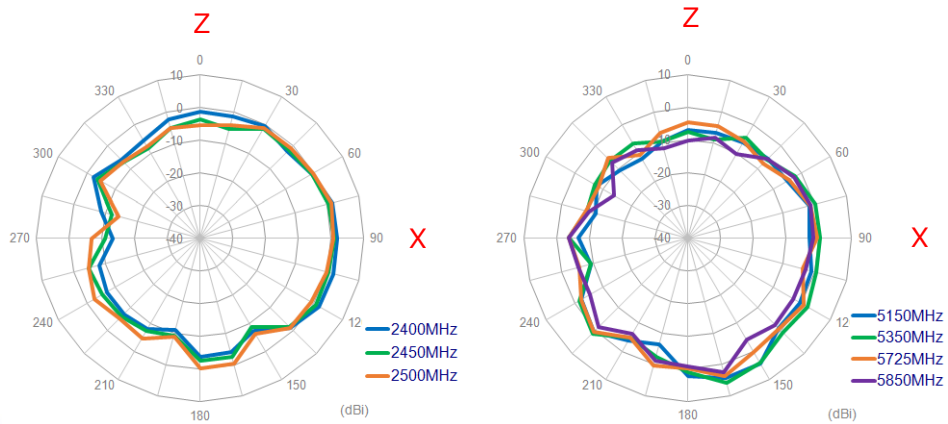


## WiFi MIMO2

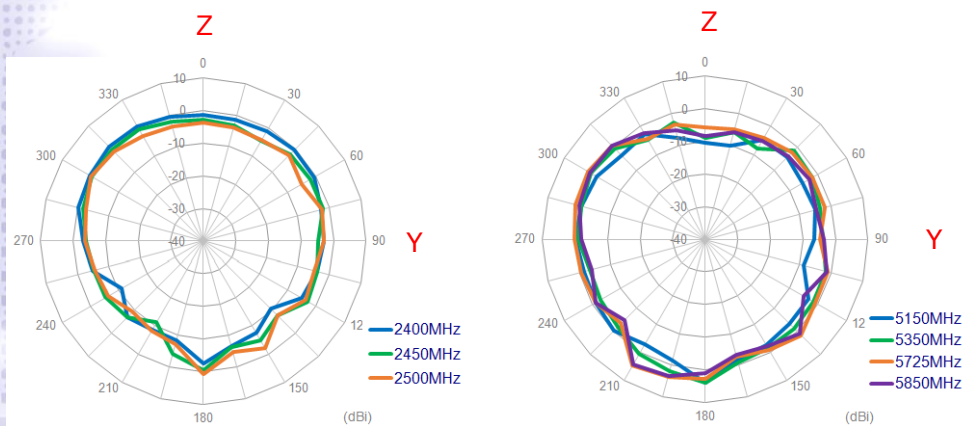
### X-Y Plane



### X-Z Plane



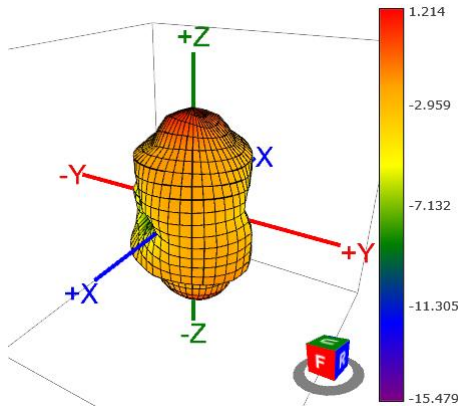
### Y-Z Plane



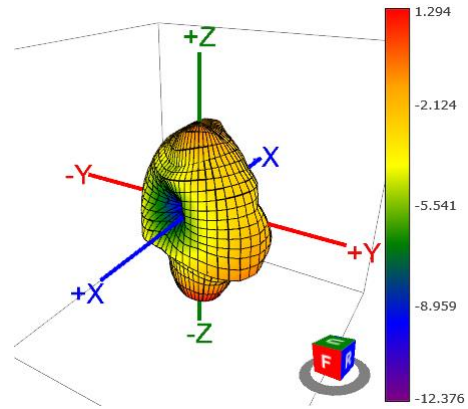
## V. 3D Radiation Pattern:

GNSS

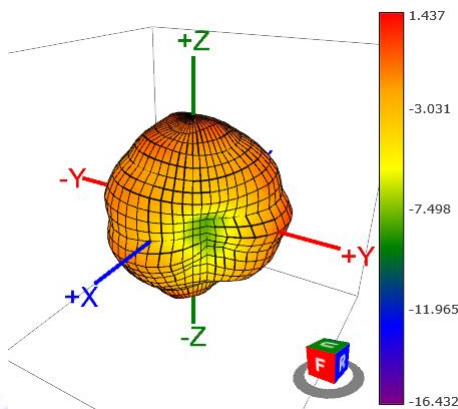
1561MHz



1575.42MHz

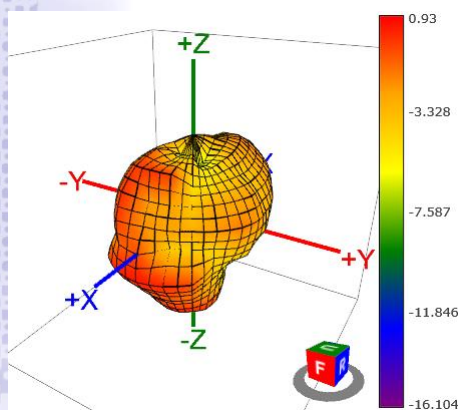


1602MHz

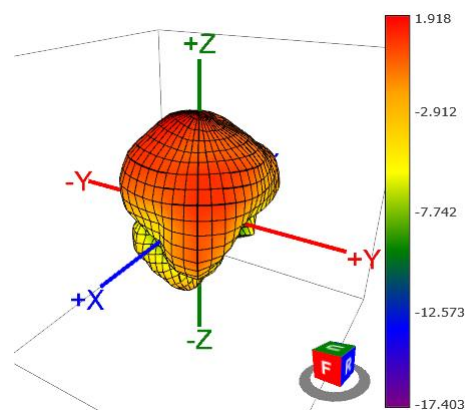


LTE MIMO1

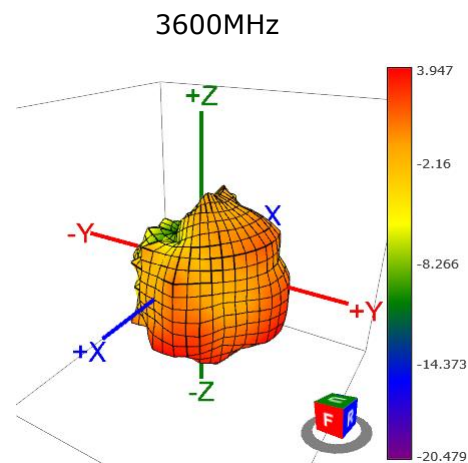
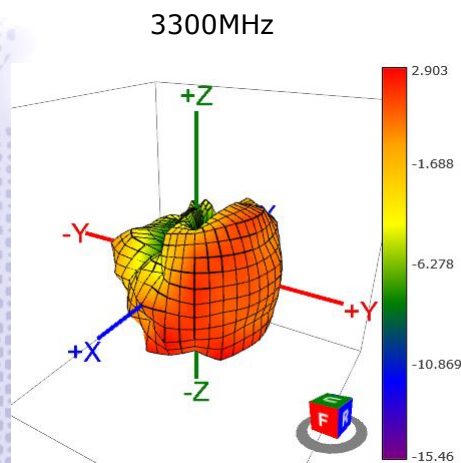
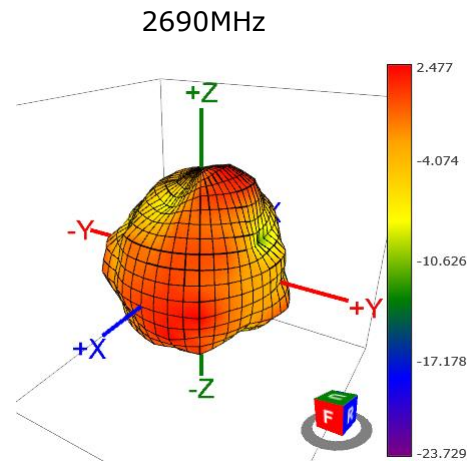
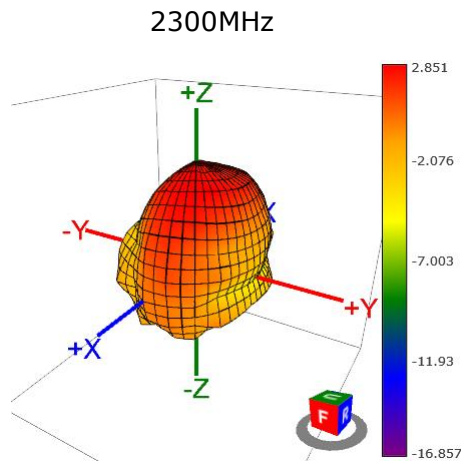
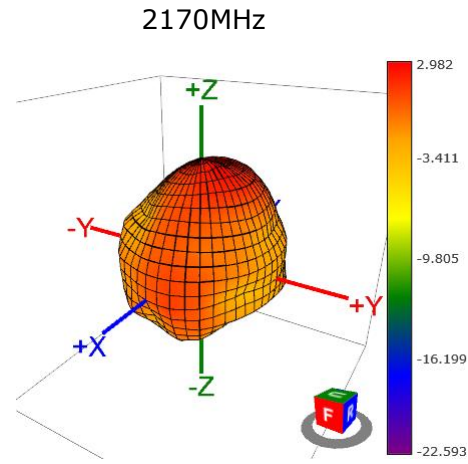
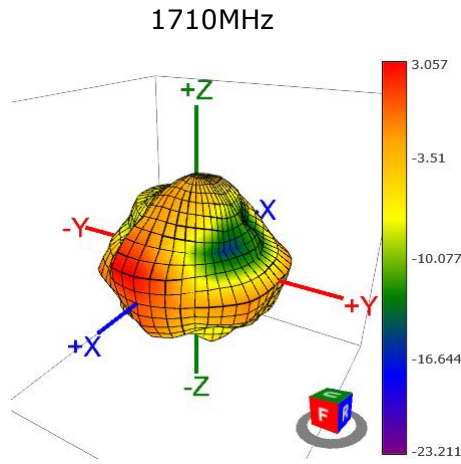
704MHz



960MHz

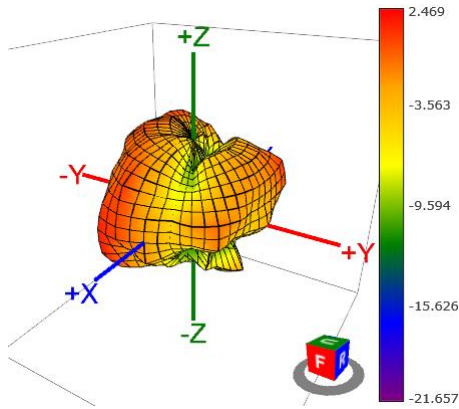


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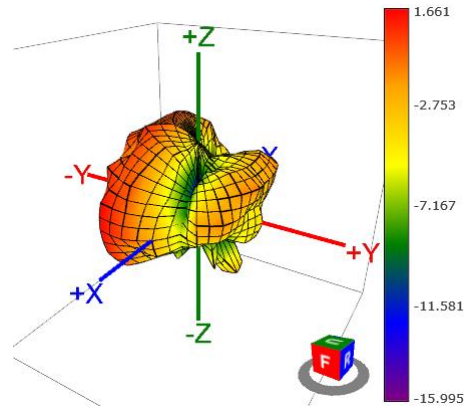




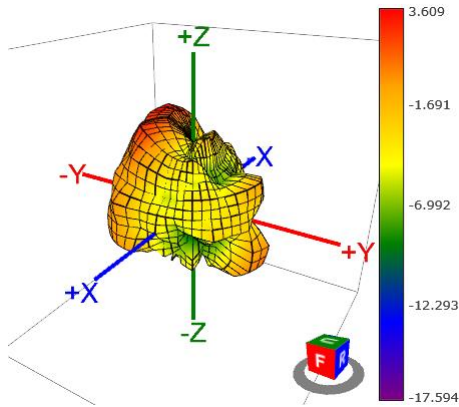
5150MHz



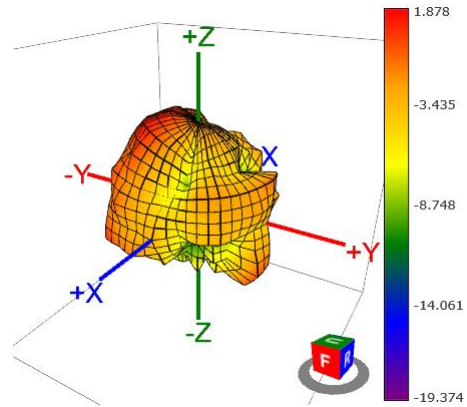
5350MHz



5725MHz

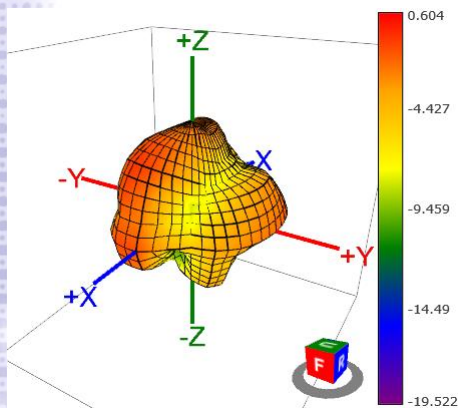


5850MHz

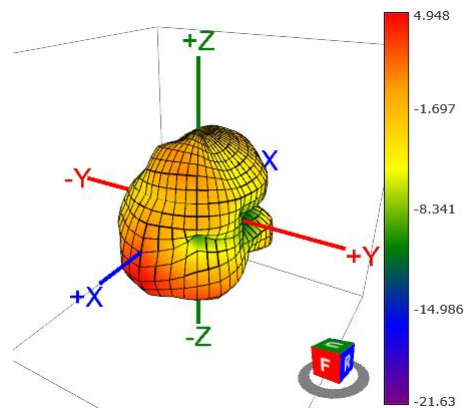


LTE MIMO2

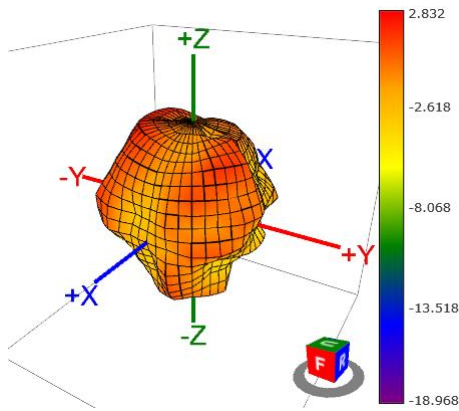
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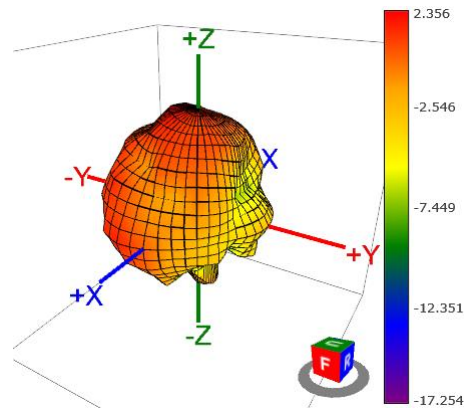
960MHz



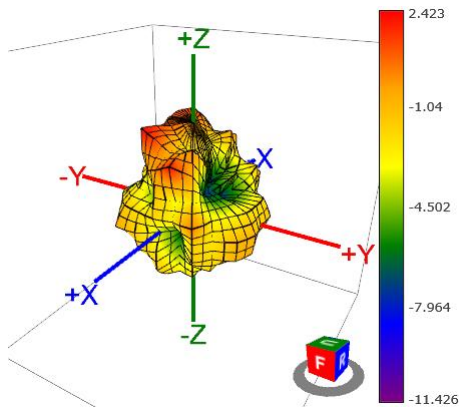
1710MHz



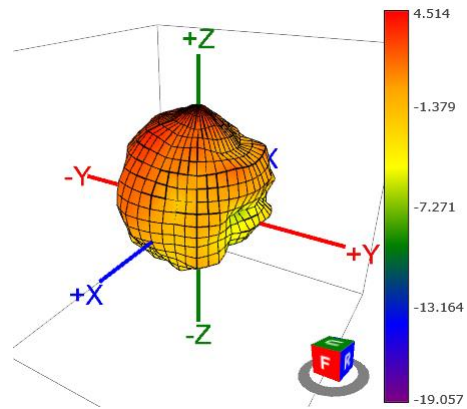
2170MHz



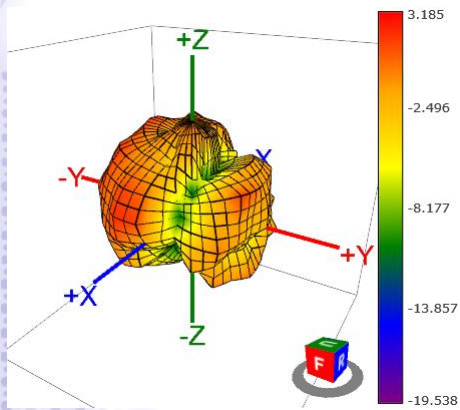
2300MHz



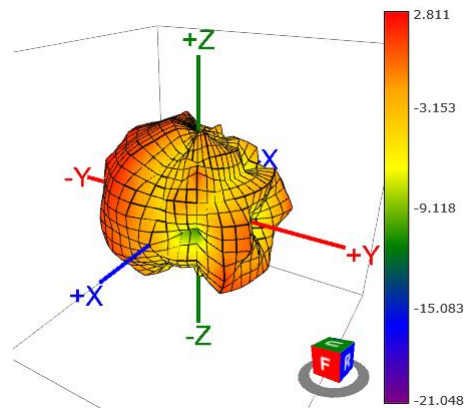
2690MHz



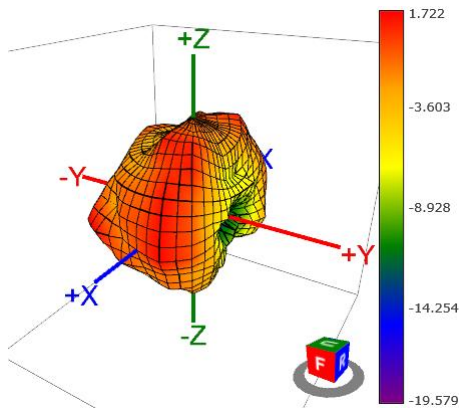
3300MHz



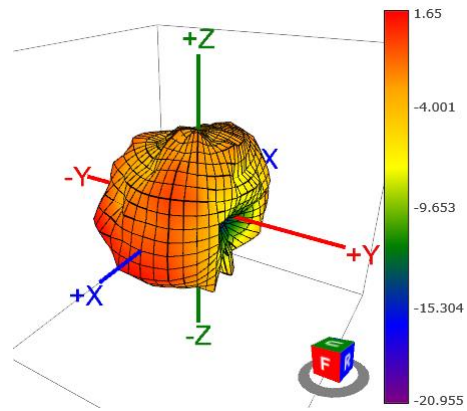
3600MHz



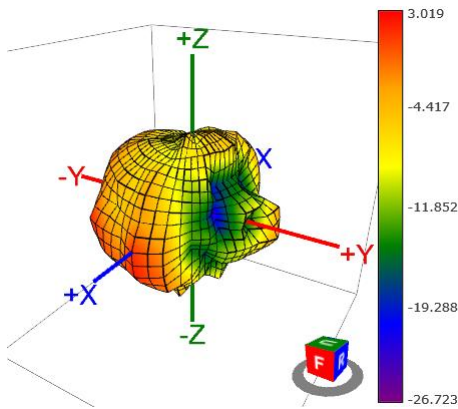
5150MHz



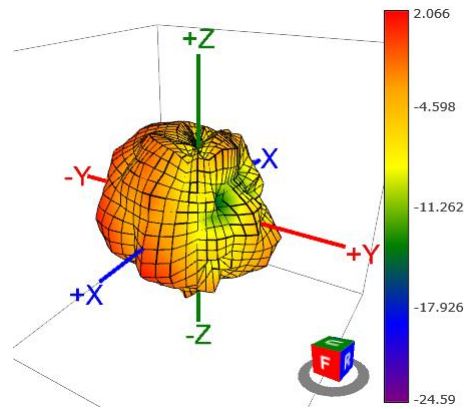
5350MHz



5725MHz

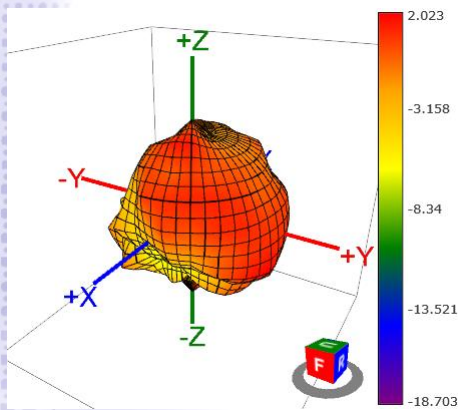


5850MHz

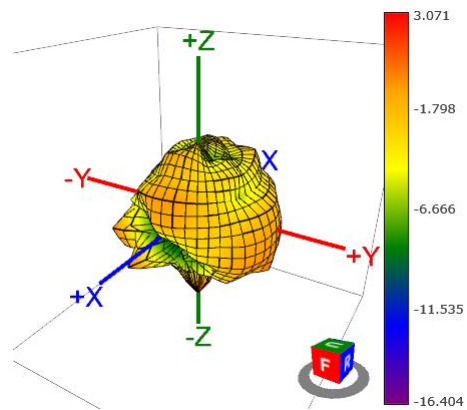


WiFi MIMO1

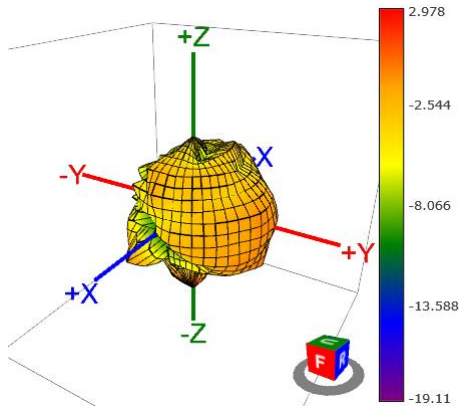
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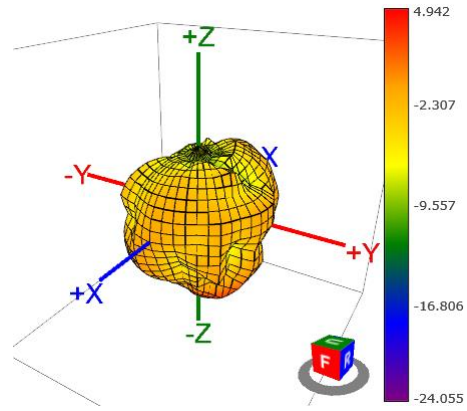
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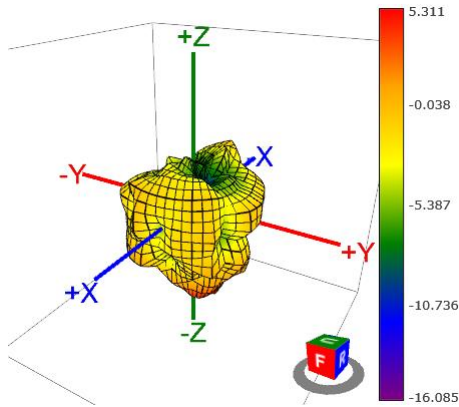
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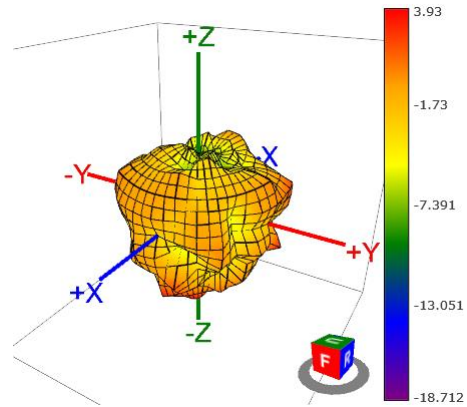
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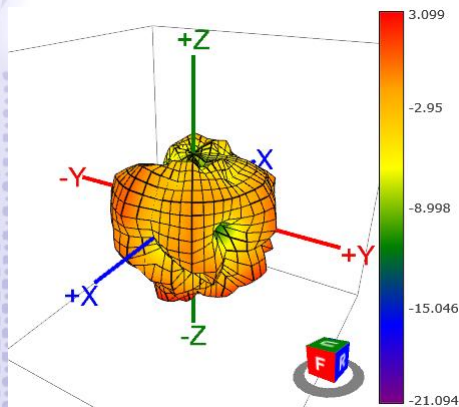
5350MHz



5750MHz



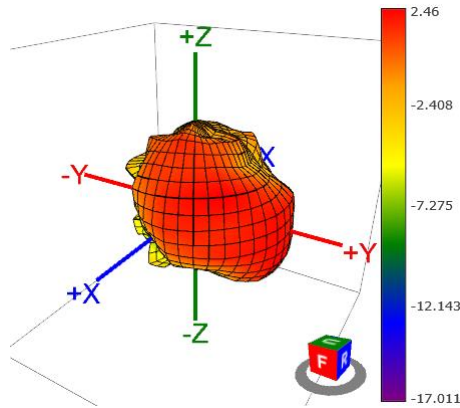
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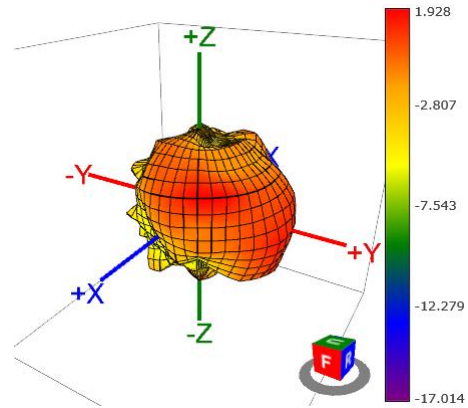
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WiFi MIMO2

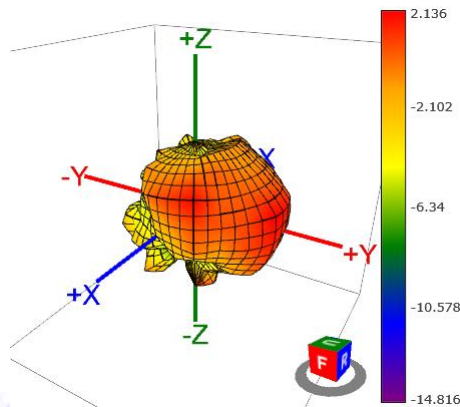
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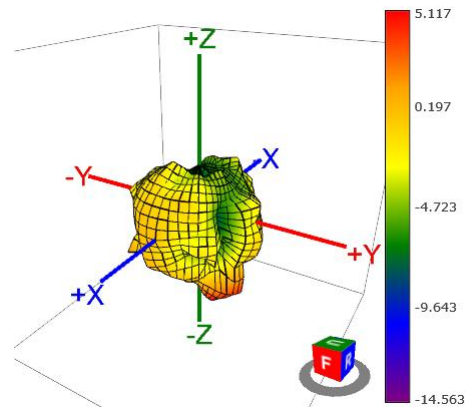
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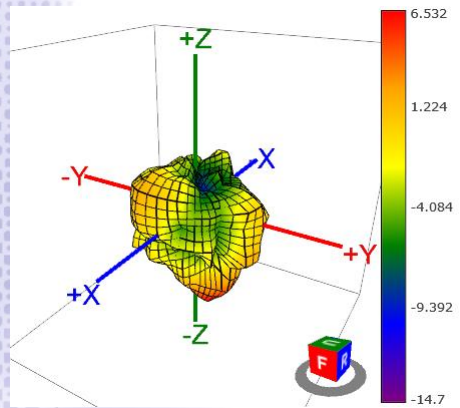
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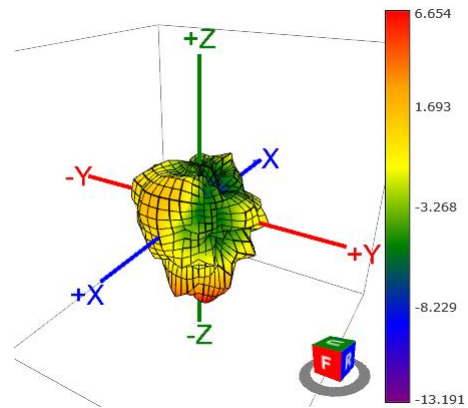
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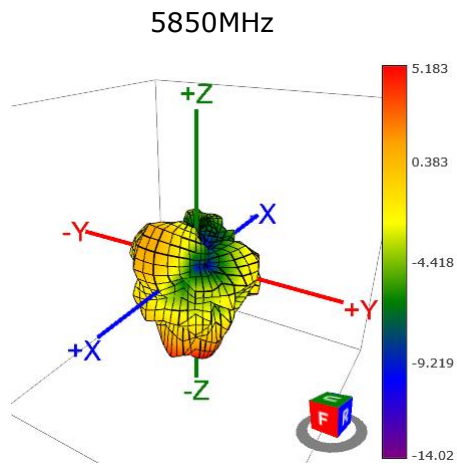
5350MHz



5750MHz



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## VI. Mechanical Drawing (Unit:mm):

